

FCC RF Test Report

APPLICANT : Acer Incorporated
EQUIPMENT : Smart HandHeld
BRAND NAME : acer
MODEL NAME : E310
FCC ID : HLZDME310SCCE
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Dec. 23, 2010 and completely tested on Dec. 30, 2010. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Anderson Chiu / Deputy Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR0D2335B	Rev. 01	Initial issue of report	Jan. 04, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	A8.4	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 13.70 dB at 0.358 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 4.69 dB at 2483.50 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Acer Incorporated

8F., No. 88, Sec. 1, Hsin Tai Wu Rd., Hsichih Town, Taipei Hsien, Taiwan, R.O.C.

1.2 Manufacturer

Compal Communications(Nanjing)Co., Ltd.

Nanjing Jiangning Export Processing Zone (South Area) No. 68-2 Suyuan Street

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Smart HandHeld
Brand Name	acer
Model Name	E310
FCC ID	HLZDME310SCCE
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 18.84 dBm (0.077 W) 802.11g : 23.45 dBm (0.221 W)
Antenna Type	PIFA Antenna with gain -0.7 dBi
HW Version	DVT2-1
SW Version	Android version: 2.2 Baseband version: E310_0.011.0K Build number: ACER_E310_0.011.0K_EMEA_GEN1
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	03CH07-HY	722060/4086B-1

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A

2 Test Configuration of Equipment Under Test

2.1 RF Power

Preliminary tests were performed in different data rate and recorded the RF power output in the following table:

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	18.10	-	-	18.43
CH 06	2437 MHz	18.30	18.63	18.75	18.84
CH 11	2462 MHz	18.05	-	-	18.41

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	23.18	-	-	-	-	-	-	-
CH 06	2437 MHz	23.45	23.44	23.31	23.15	23.06	23.09	23.42	23.41
CH 11	2462 MHz	23.32	-	-	-	-	-	-	-

Remark:

1. The data rates of WLAN 802.11b/g were set in 11Mbps for 802.11b and 6Mbps for 802.11g, for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

2.2 Test Mode

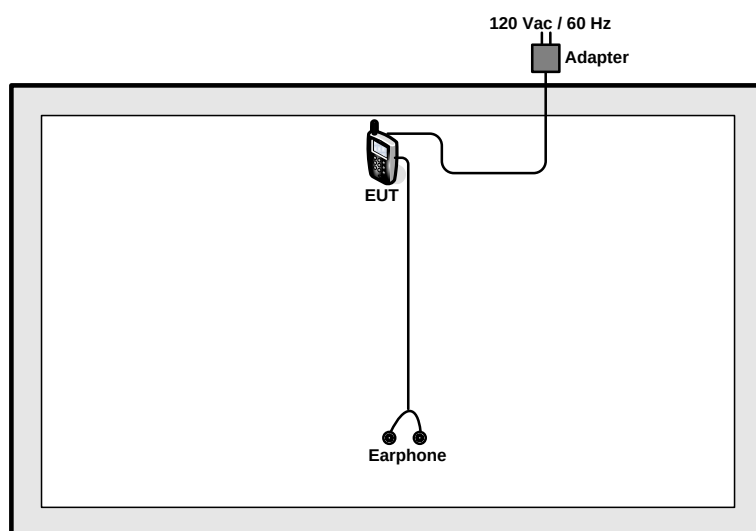
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The following tables are showing the test modes as the worst cases and recorded in this report.

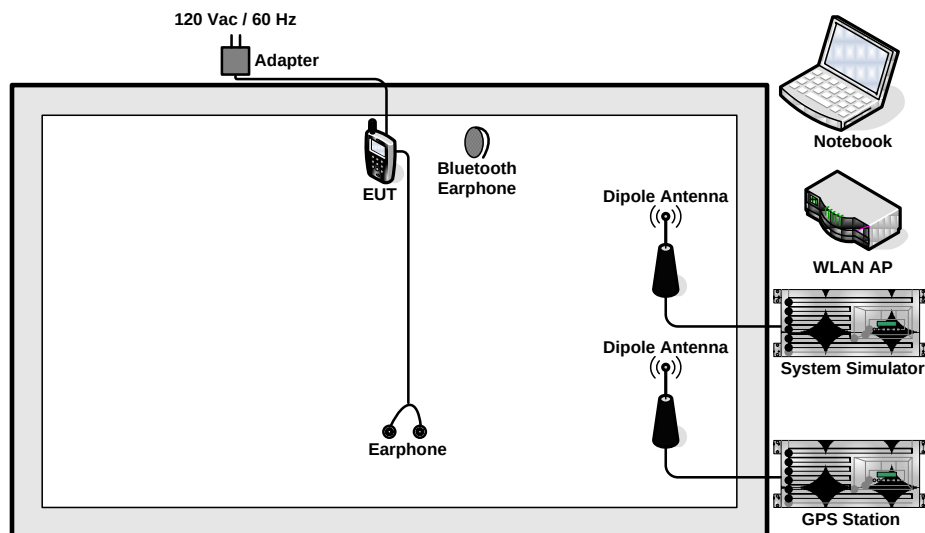
Test Cases		
Test Item	802.11b	802.11g
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4 : 802.11g CH01_2412 MHz Mode 5 : 802.11g CH06_2437 MHz Mode 6 : 802.11g CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4 : 802.11g CH01_2412 MHz Mode 5 : 802.11g CH06_2437 MHz Mode 6 : 802.11g CH11_2462 MHz
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + USB Cable (Charging from Adapter)	

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<EUT with Adapter Mode>



2.4 RF Utility

The programmed RF utility, "Remote 432X controller" is installed in EUT to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

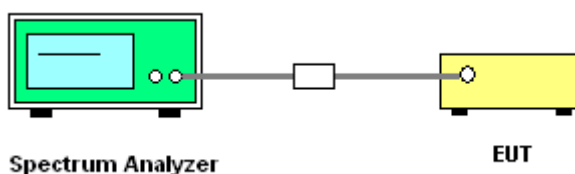
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz.
In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

3.1.4 Test Setup

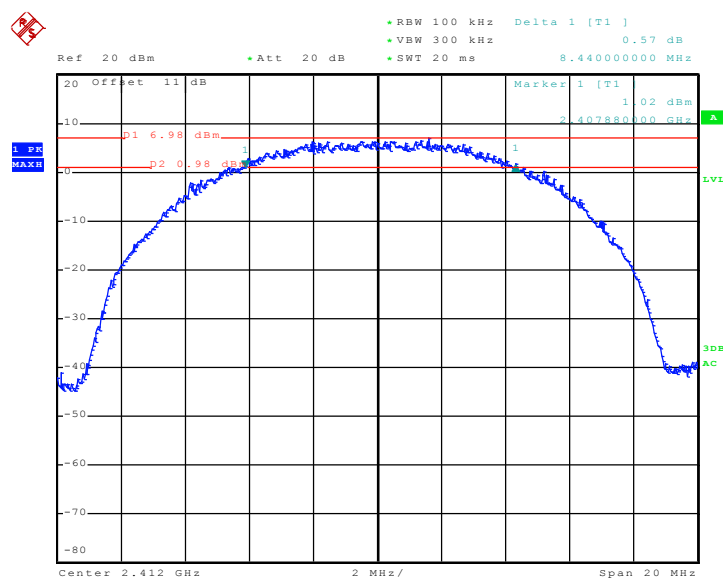


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	23~25℃
Test Engineer :	Hauk Yu	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	8.44	0.5	Pass
06	2437	8.96	0.5	Pass
11	2462	9.28	0.5	Pass

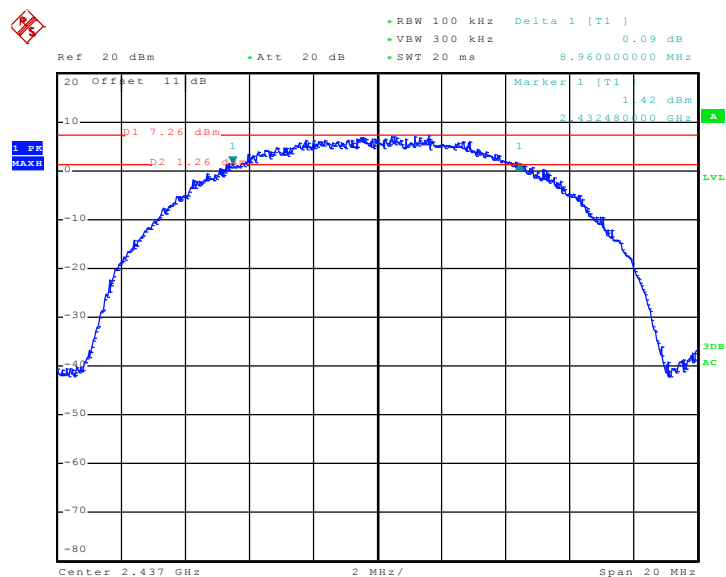
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 27.DEC.2010 12:36:47

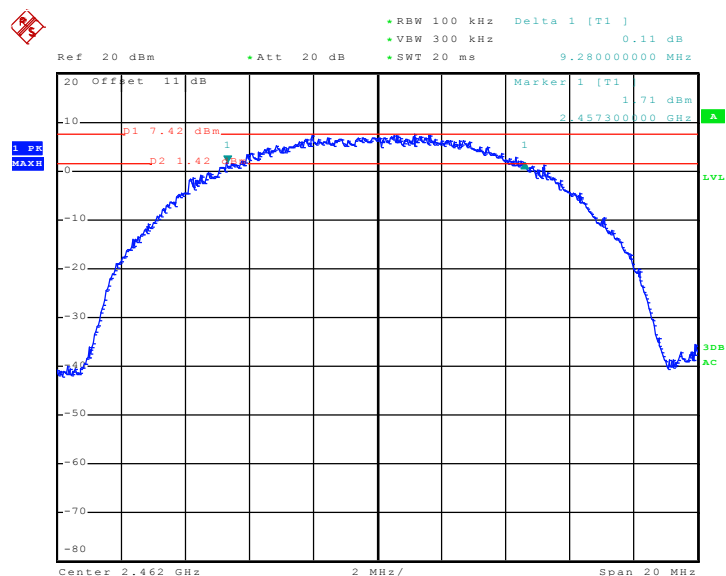


Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06

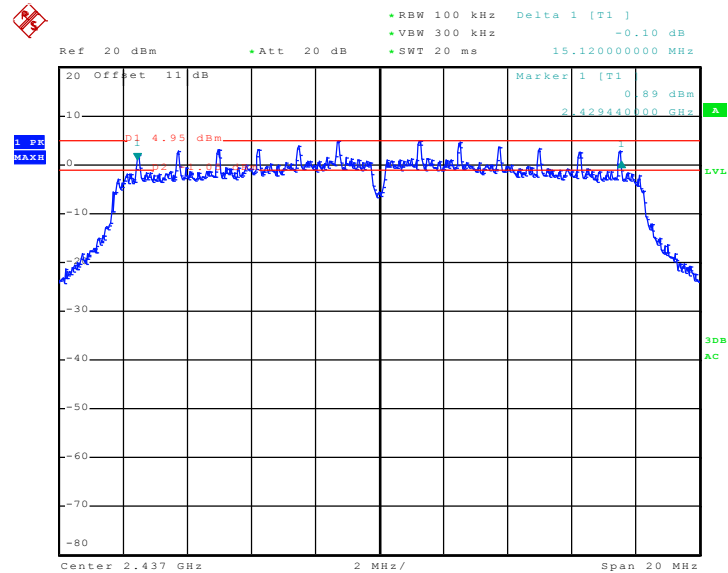


Date: 27.DEC.2010 12:41:36

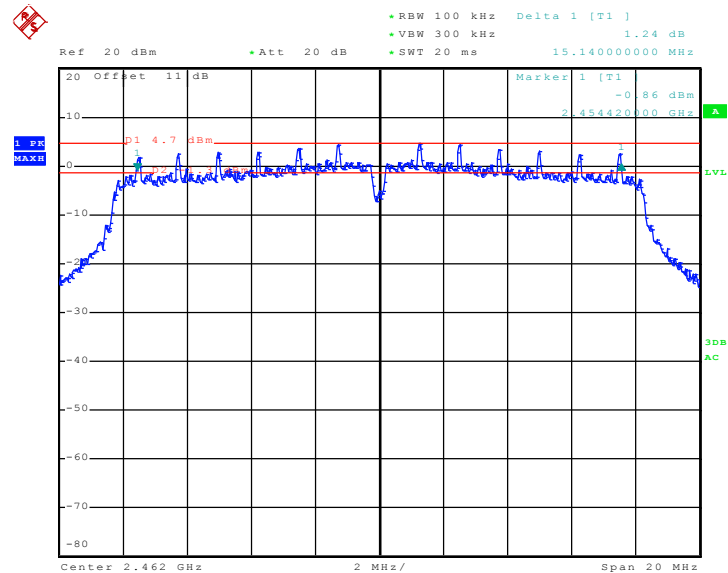
Mode 3 : 6 dB Bandwidth Plot on 802.11b Channel 11



Date: 27.DEC.2010 12:21:28

Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06


Date: 27.DEC.2010 11:27:20

Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 11


Date: 27.DEC.2010 11:14:29

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

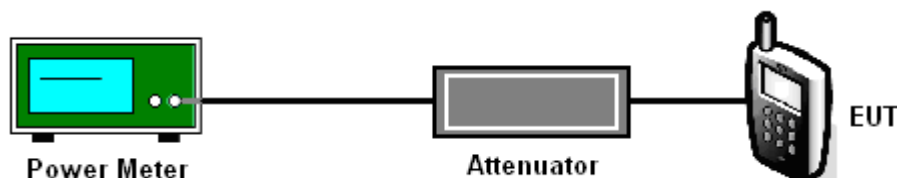
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the power meter by a low loss cable.
3. Measure the power by power meter.

3.2.4 Test Setup



3.2.5 Test Result of Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	23~25℃
Test Engineer :	Hauk Yu	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	18.43	30	Pass
06	2437	18.84	30	Pass
11	2462	18.41	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	23~25℃
Test Engineer :	Hauk Yu	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	23.18	30	Pass
06	2437	23.45	30	Pass
11	2462	23.32	30	Pass

3.3 Band Edges Measurement

3.3.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB.

3.3.2 Measuring Instruments

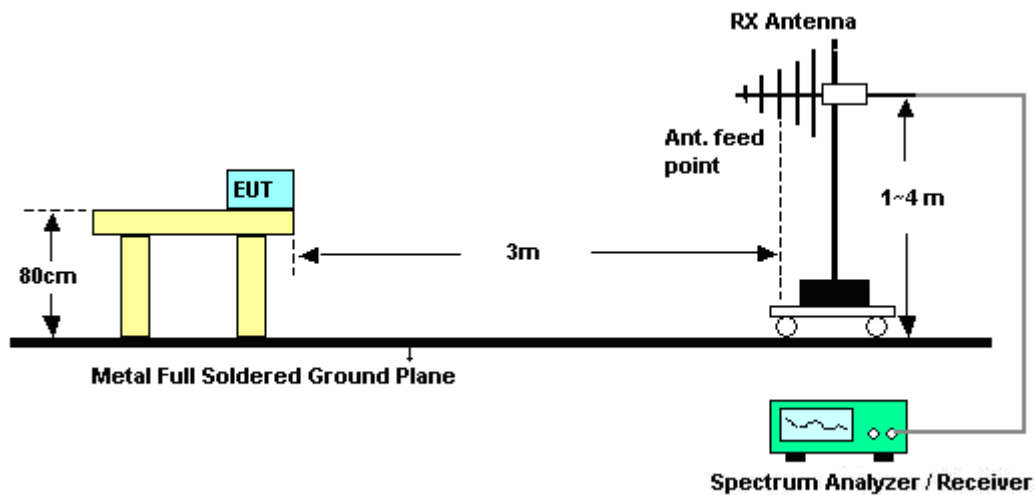
See list of measuring instruments of this test report.

3.3.3 Test Procedures

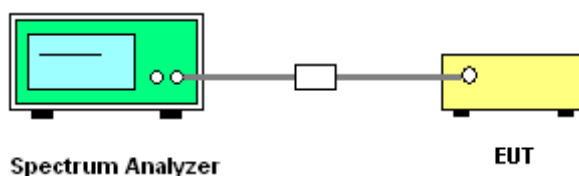
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Apply to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation as in FCC Section 15.35(b) and (c).

3.3.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>



3.3.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	22~24℃
Test Band :	802.11b	Relative Humidity :	48~52%
Test Channel :	01	Test Engineer :	Jason Wang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	49.71	-24.29	74	45.35	32.18	6.03	33.85	102	24	Peak
2389.99	37.42	-16.58	54	33.06	32.18	6.03	33.85	102	24	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2356.74	46.33	-27.67	74	42.05	32.13	5.99	33.84	139	322	Peak
2356.74	33.67	-20.33	54	29.39	32.13	5.99	33.84	139	322	Average

Test Mode :	Mode 3	Temperature :	22~24℃
Test Band :	802.11b	Relative Humidity :	48~52%
Test Channel :	11	Test Engineer :	Jason Wang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.66	53.26	-20.74	74	48.7	32.28	6.18	33.9	102	19	Peak
2483.66	40.1	-13.9	54	35.54	32.28	6.18	33.9	102	19	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.85	48.53	-25.47	74	43.97	32.28	6.18	33.9	100	309	Peak
2483.85	36.08	-17.92	54	31.52	32.28	6.18	33.9	100	309	Average



Test Mode :	Mode 4	Temperature :	22~24℃
Test Band :	802.11g	Relative Humidity :	48~52%
Test Channel :	01	Test Engineer :	Jason Wang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	58.97	-15.03	74	54.61	32.18	6.03	33.85	103	15	Peak
2389.99	41.43	-12.57	54	37.07	32.18	6.03	33.85	103	15	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	52.88	-21.12	74	48.52	32.18	6.03	33.85	100	263	Peak
2389.99	36.01	-17.99	54	31.65	32.18	6.03	33.85	100	263	Average

Test Mode :	Mode 6	Temperature :	22~24℃
Test Band :	802.11g	Relative Humidity :	48~52%
Test Channel :	11	Test Engineer :	Jason Wang

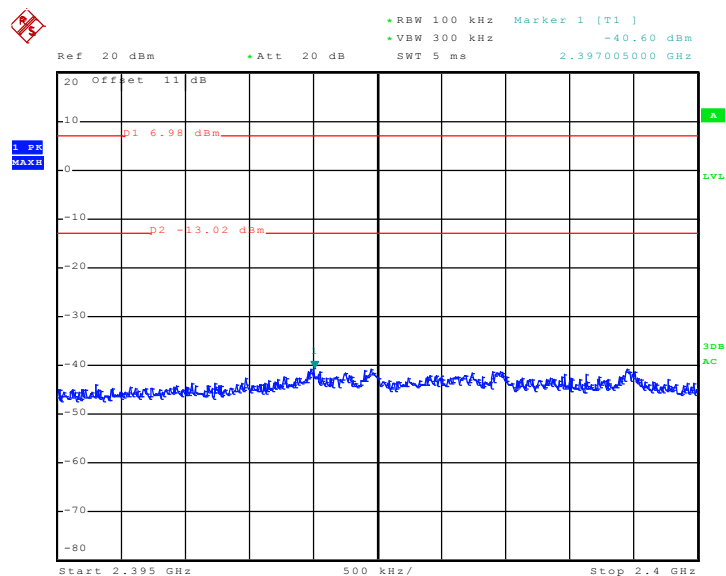
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	69.16	-4.84	74	64.6	32.28	6.18	33.9	102	17	Peak
2483.5	49.31	-4.69	54	44.75	32.28	6.18	33.9	102	17	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.85	61.98	-12.02	74	57.42	32.28	6.18	33.9	100	293	Peak
2483.85	41.82	-12.18	54	37.26	32.28	6.18	33.9	100	293	Average

3.3.6 Test Plots of Conducted Band Edges

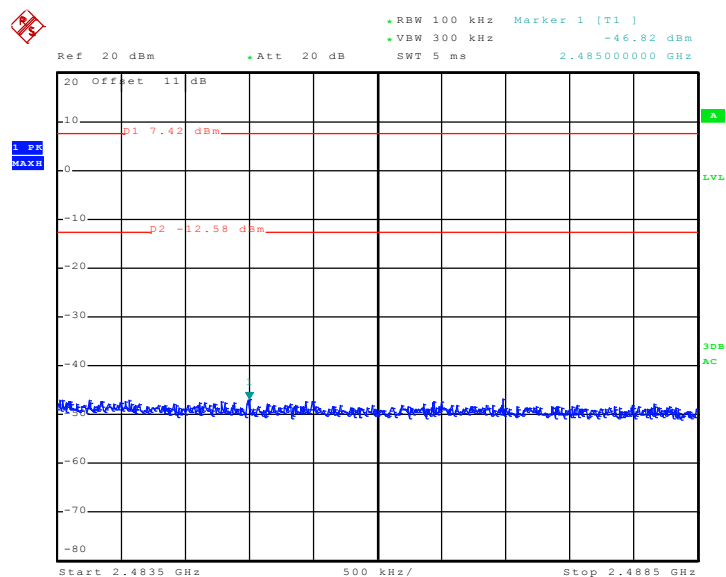
Test Mode :	Mode 1 and 3	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	45~49%
Test Channel :	01 and 11	Test Engineer :	Hauk Yu

Low Band Edge Plot on 802.11b Channel 01



Date: 27.DEC.2010 12:37:57

High Band Edge Plot on 802.11b Channel 11

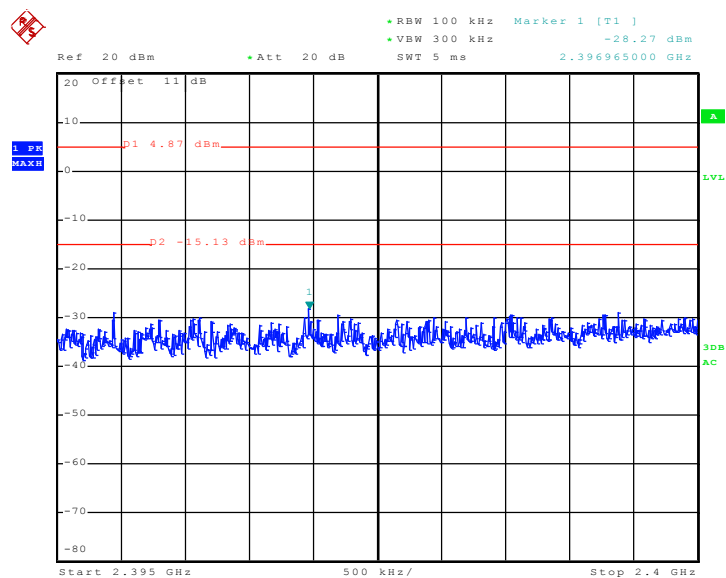


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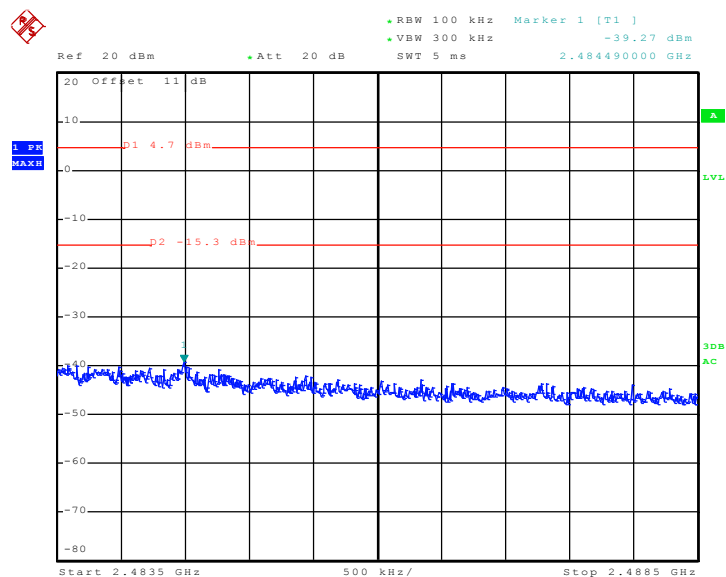
Test Mode :	Mode 4 and 6	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	45~49%
Test Channel :	01 and 11	Test Engineer :	Hauk Yu

Low Band Edge Plot on 802.11g Channel 01



Date: 27.DEC.2010 10:59:14

High Band Edge Plot on 802.11g Channel 11



Date: 27.DEC.2010 11:15:17

3.4 Spurious Emission Measurement

3.4.1 Limit of Spurious Emission Measurement

All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band.

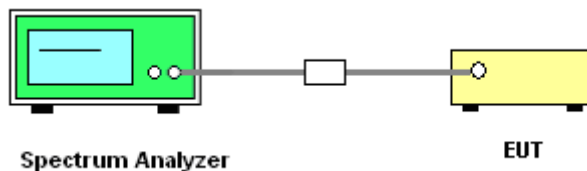
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

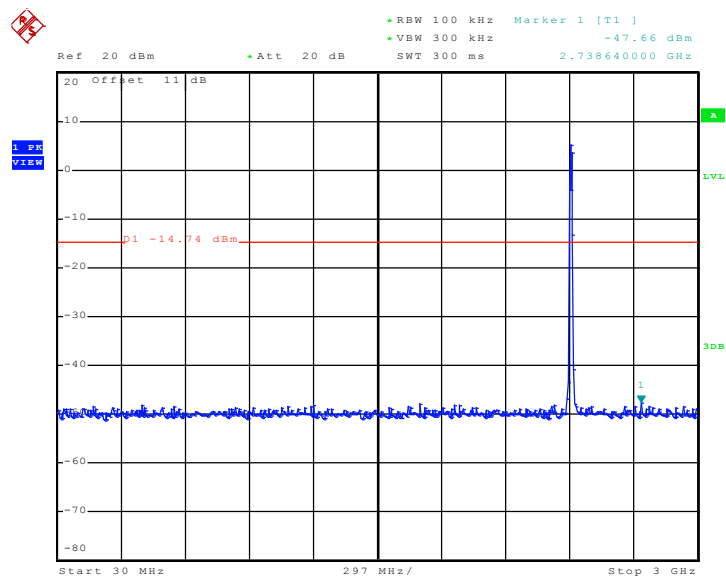
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

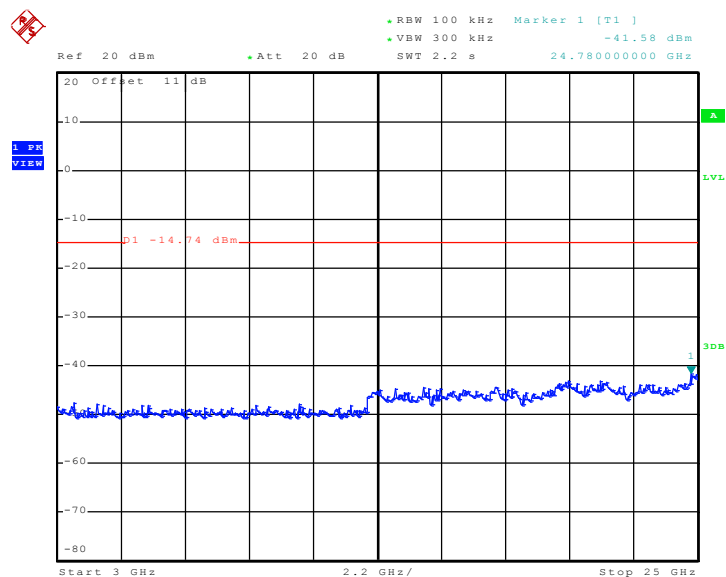
Test Mode :	Mode 1	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	45~49%
Test Channel :	01	Test Engineer :	Hauk Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



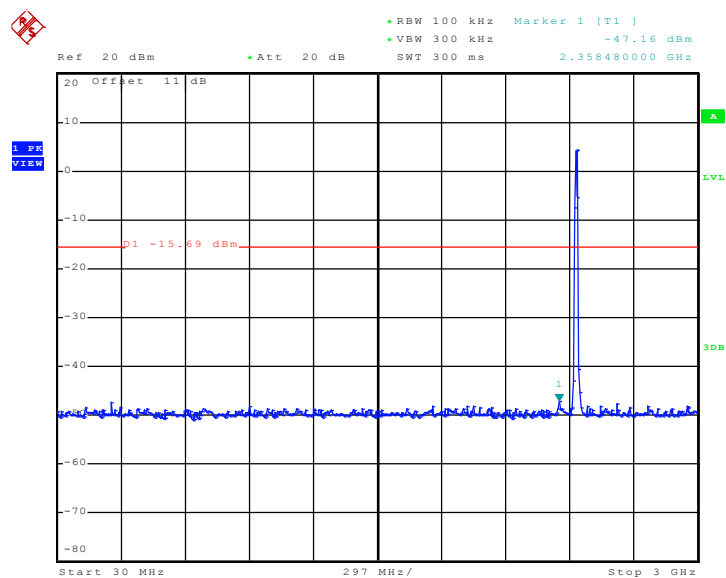
Date: 27.DEC.2010 20:14:30

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

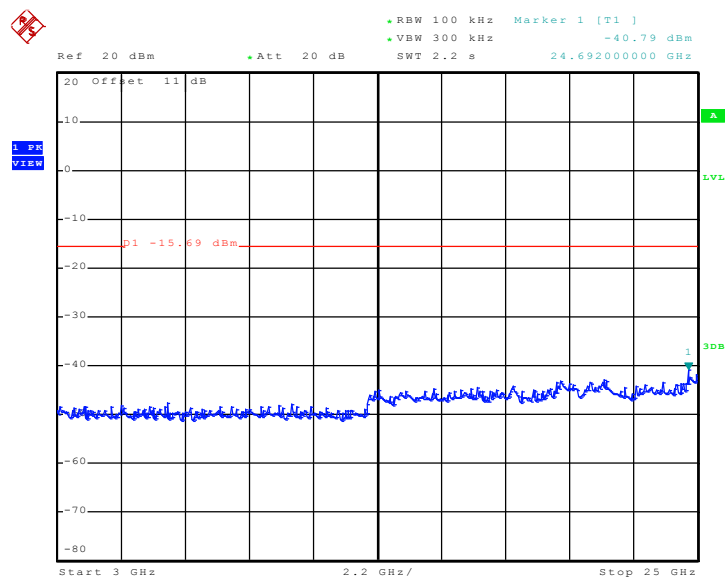


Date: 27.DEC.2010 20:15:08

Test Mode :	Mode 2	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	45~49%
Test Channel :	06	Test Engineer :	Hauk Yu

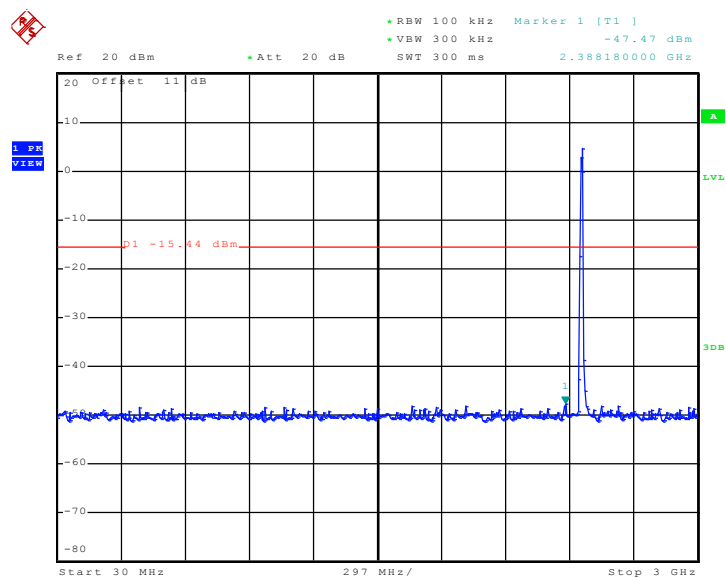
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 27.DEC.2010 20:12:49

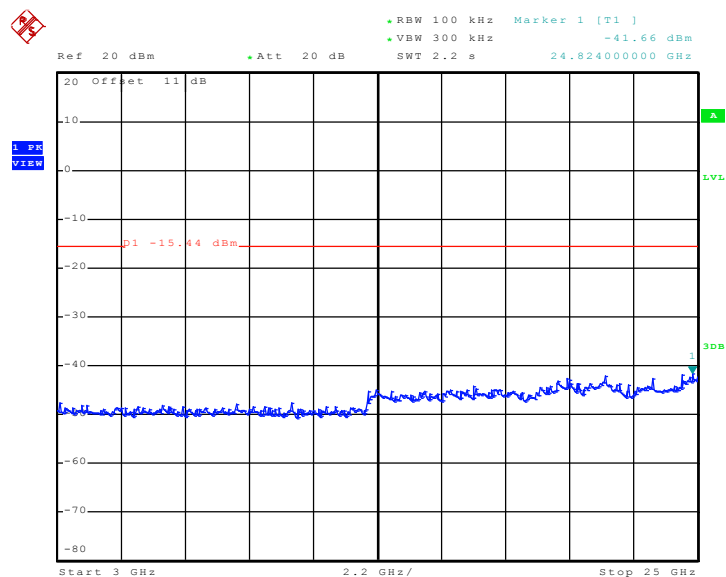
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 27.DEC.2010 20:13:26

Test Mode :	Mode 3	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	45~49%
Test Channel :	11	Test Engineer :	Hauk Yu

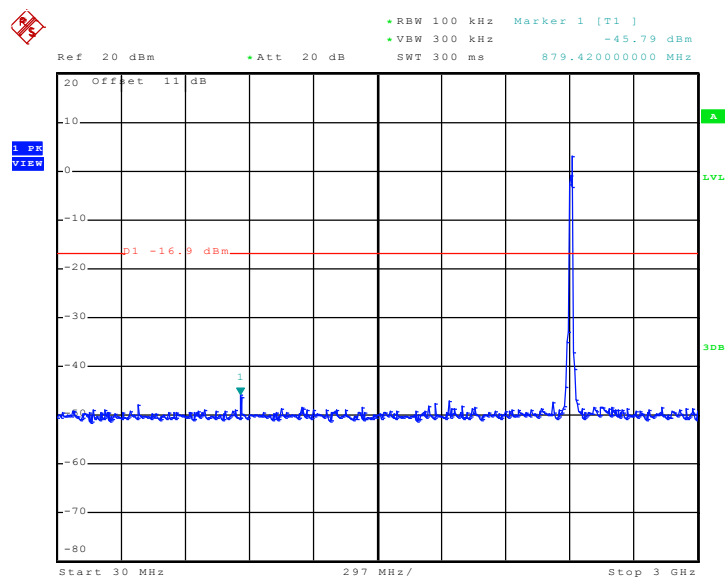
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 27.DEC.2010 20:10:07

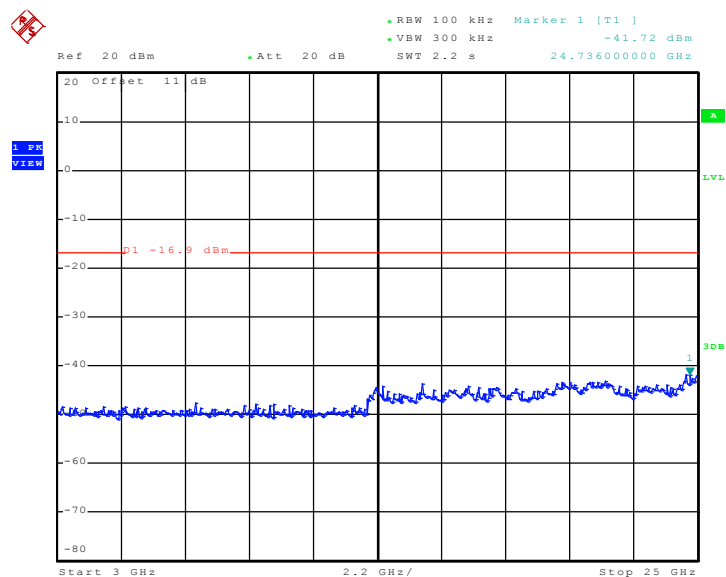
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 27.DEC.2010 20:11:10

Test Mode :	Mode 4	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	45~49%
Test Channel :	01	Test Engineer :	Hauk Yu

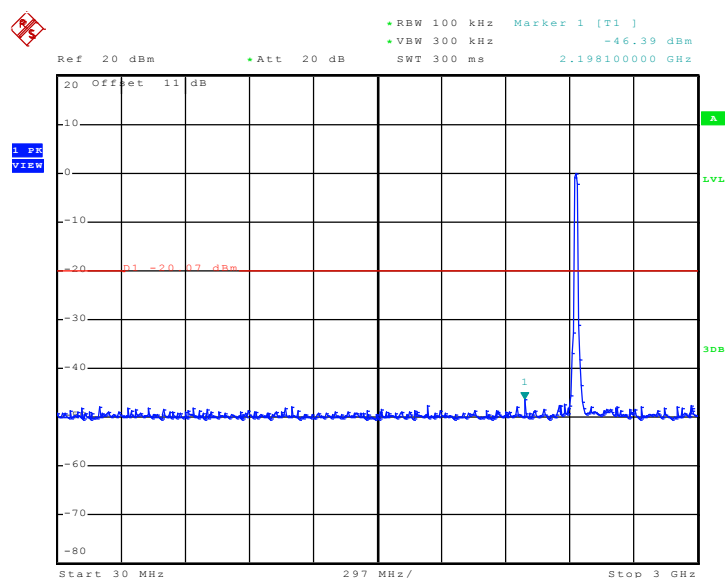
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 27.DEC.2010 20:00:56

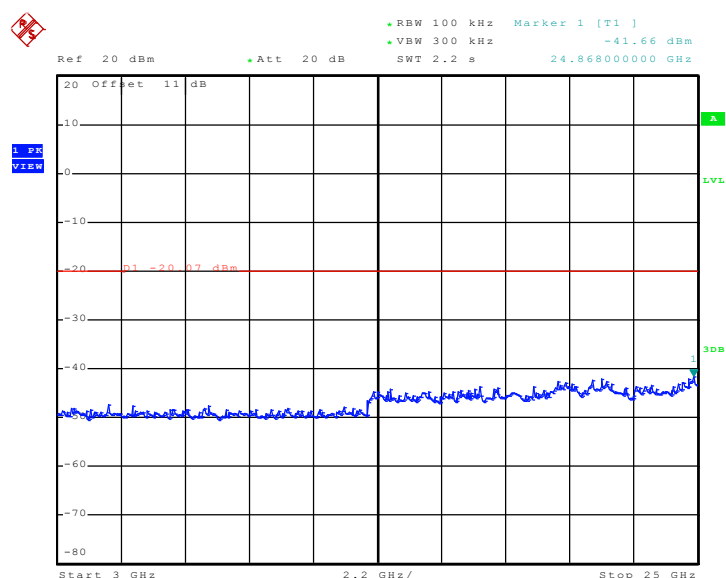
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 27.DEC.2010 20:01:46

Test Mode :	Mode 5	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	45~49%
Test Channel :	06	Test Engineer :	Hauk Yu

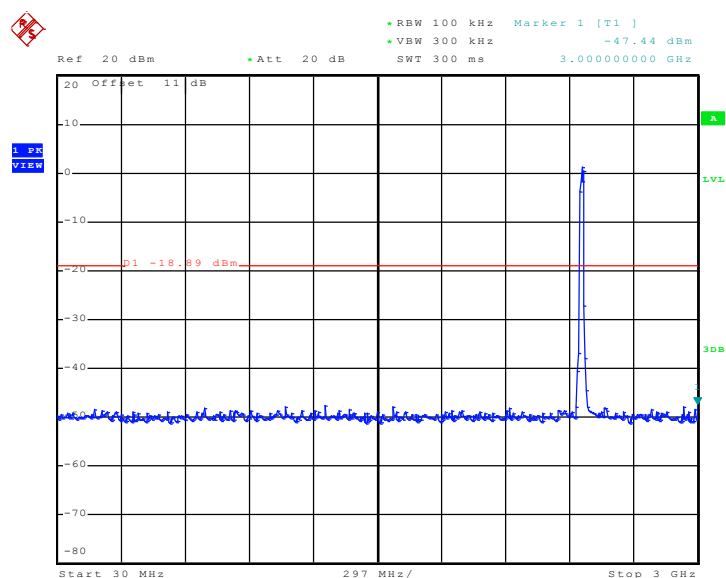
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 27.DEC.2010 20:03:23

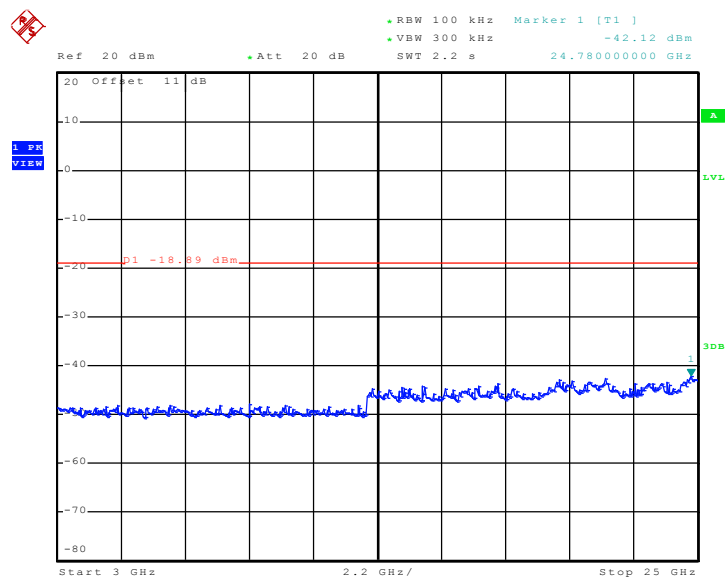
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 27.DEC.2010 20:05:05

Test Mode :	Mode 6	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	45~49%
Test Channel :	11	Test Engineer :	Hauk Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 27.DEC.2010 20:07:55

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 27.DEC.2010 20:08:43

3.5 Power Spectral Density Measurement

3.5.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

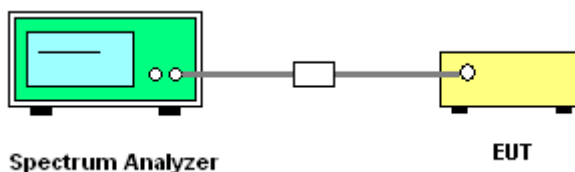
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The test follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Take the measured data from spectrum analyzer.

3.5.4 Test Setup

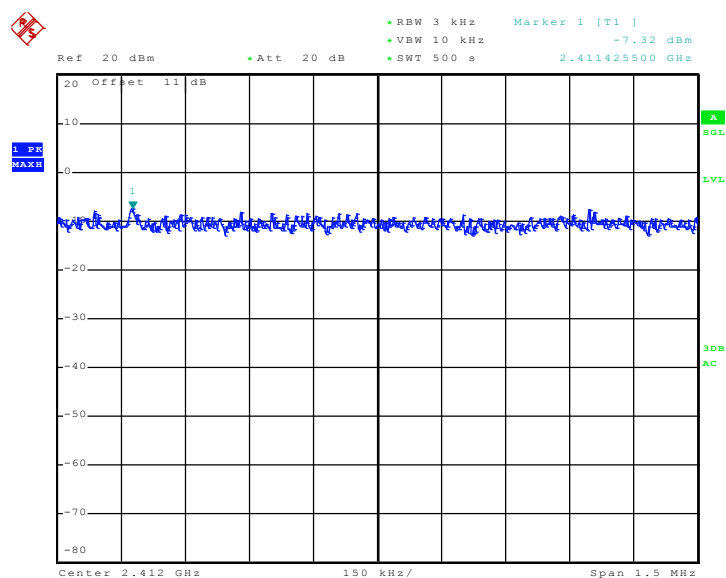


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	23~25℃
Test Engineer :	Hauk Yu	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-7.32	8	Pass
06	2437	-6.87	8	Pass
11	2462	-6.99	8	Pass

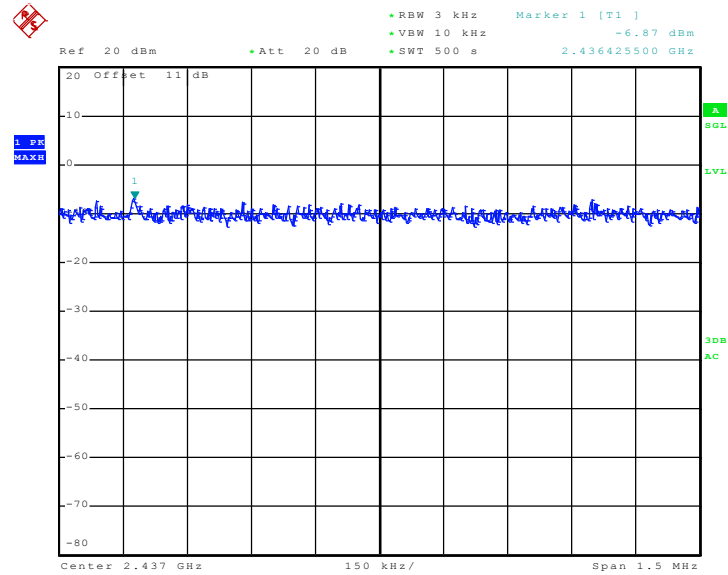
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 27.DEC.2010 13:00:15

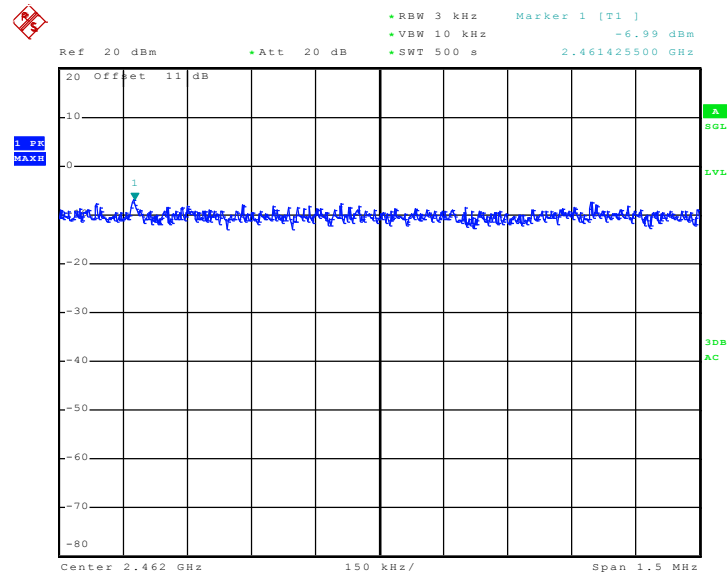


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 27.DEC.2010 12:51:07

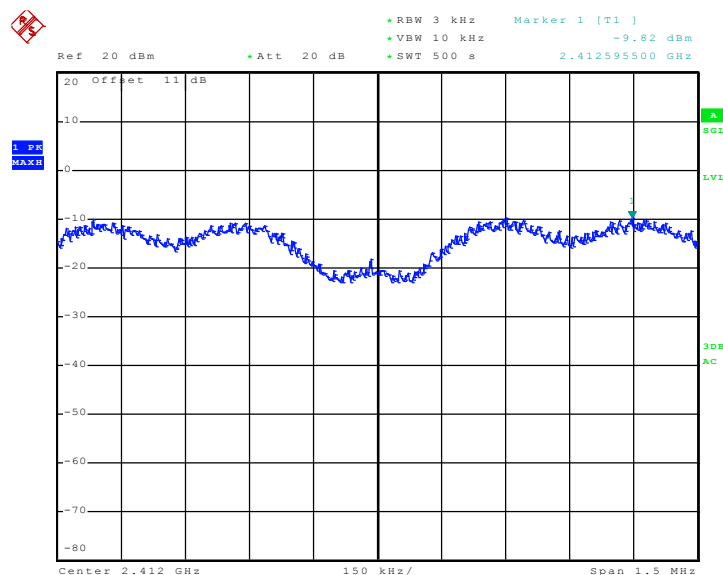
Mode 3 : PSD Plot on 802.11b Channel 11



Date: 27.DEC.2010 13:10:39

Test Mode :	Mode 4, 5, 6	Temperature :	23~25℃
Test Engineer :	Hauk Yu	Relative Humidity :	45~49%

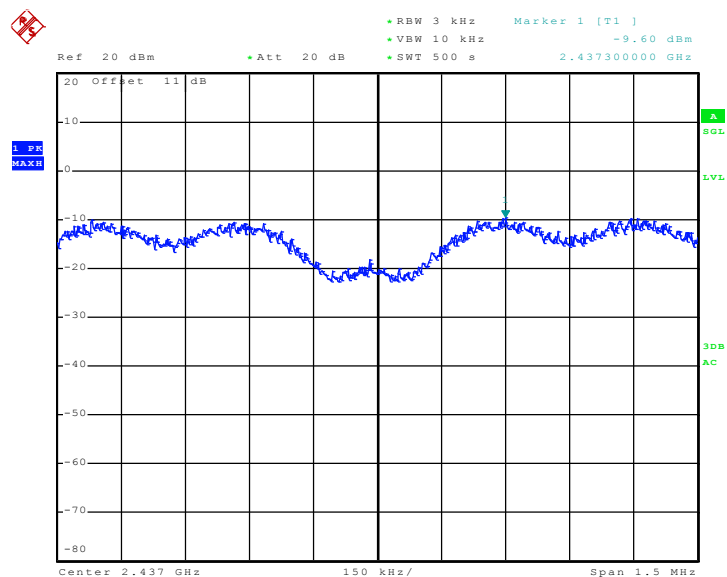
Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-9.82	8	Pass
06	2437	-9.60	8	Pass
11	2462	-9.80	8	Pass

Mode 4 : PSD Plot on 802.11g Channel 01


Date: 27.DEC.2010 11:12:22

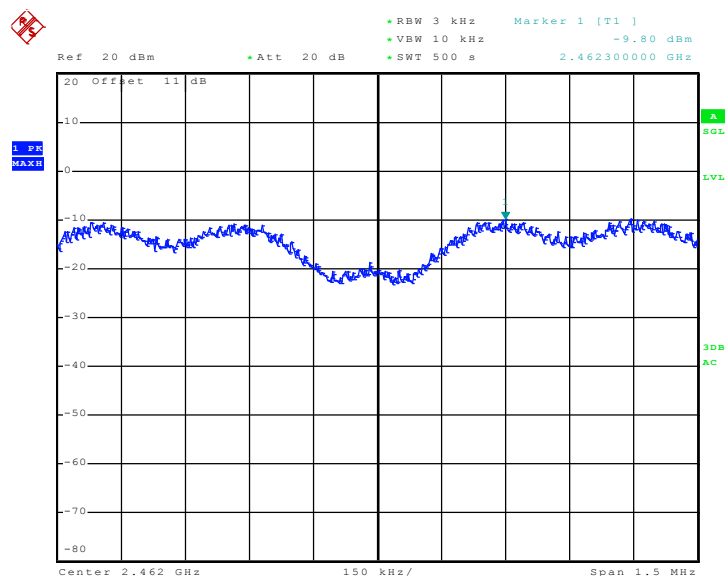


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 27.DEC.2010 11:36:57

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 27.DEC.2010 11:47:10

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

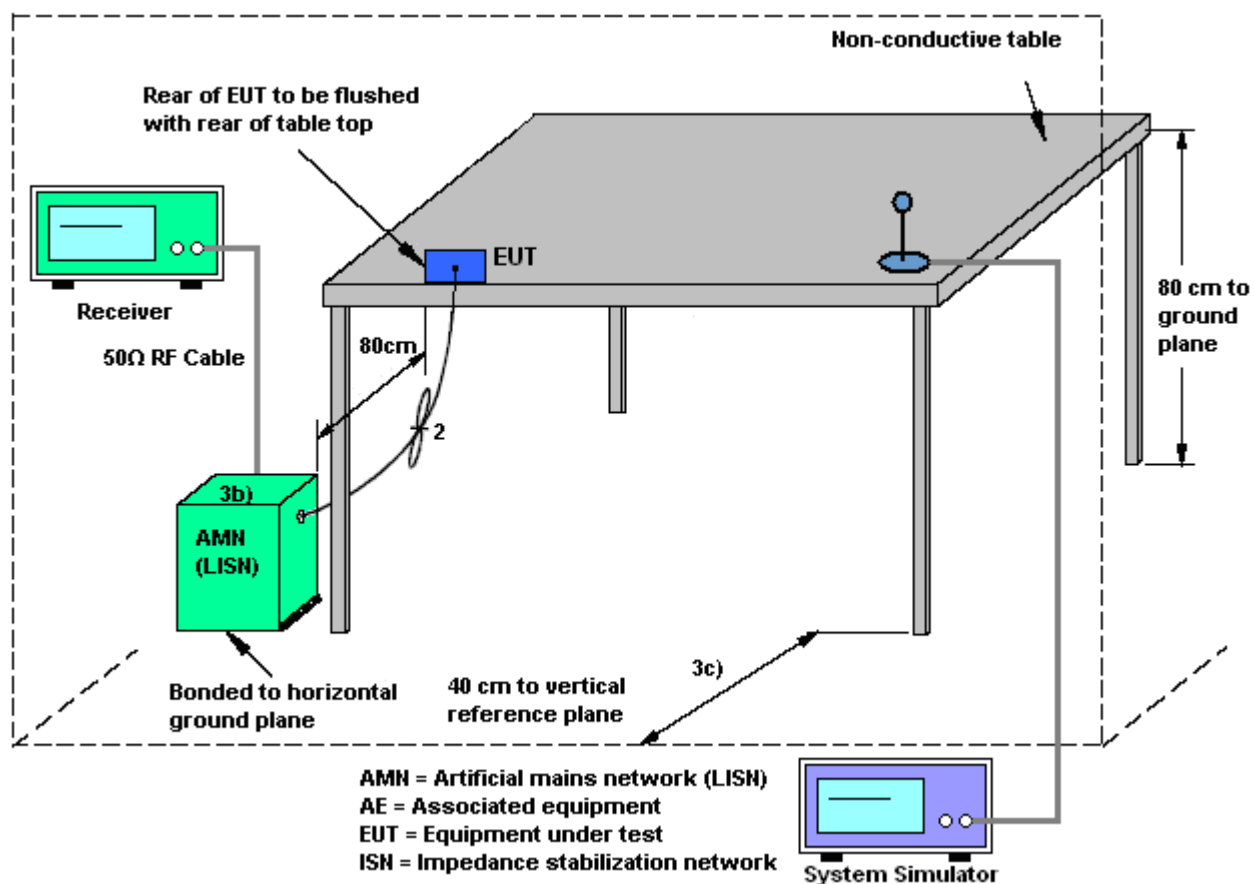
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

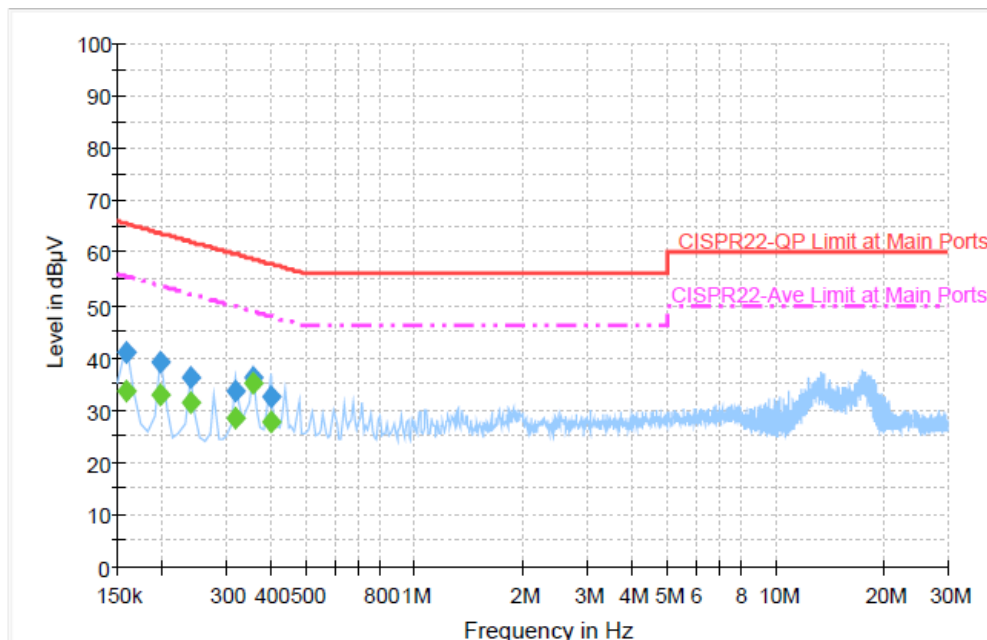
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



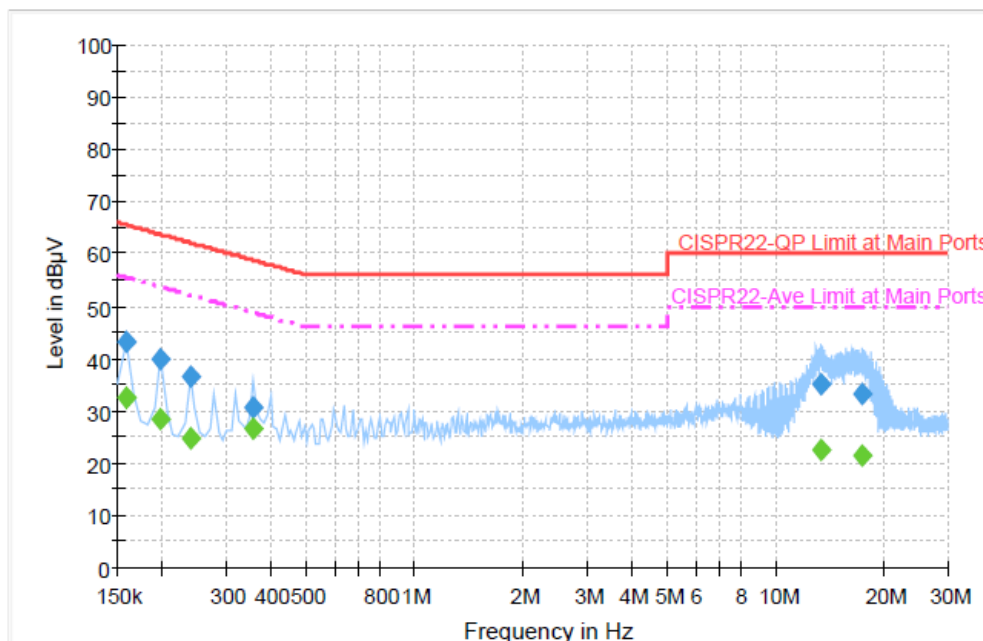
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	40.9	Off	L1	19.3	24.7	65.6
0.198000	39.1	Off	L1	19.3	24.6	63.7
0.238000	36.1	Off	L1	19.4	26.1	62.2
0.318000	33.4	Off	L1	19.3	26.4	59.8
0.358000	36.1	Off	L1	19.3	22.7	58.8
0.398000	32.3	Off	L1	19.4	25.6	57.9

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	33.5	Off	L1	19.3	22.1	55.6
0.198000	32.9	Off	L1	19.3	20.8	53.7
0.238000	31.4	Off	L1	19.4	20.8	52.2
0.318000	28.4	Off	L1	19.3	21.4	49.8
0.358000	35.1	Off	L1	19.3	13.7	48.8
0.398000	27.6	Off	L1	19.4	20.3	47.9

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	43.1	Off	N	19.4	22.5	65.6
0.198000	39.7	Off	N	19.3	24.0	63.7
0.238000	36.5	Off	N	19.4	25.7	62.2
0.358000	30.6	Off	N	19.3	28.2	58.8
13.390000	35.2	Off	N	19.8	24.8	60.0
17.374000	33.1	Off	N	19.8	26.9	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	32.6	Off	N	19.4	23.0	55.6
0.198000	28.4	Off	N	19.3	25.3	53.7
0.238000	24.7	Off	N	19.4	27.5	52.2
0.358000	26.7	Off	N	19.3	22.1	48.8
13.390000	22.4	Off	N	19.8	27.6	50.0
17.374000	21.5	Off	N	19.8	28.5	50.0

3.7 Radiated Emission Measurement

3.7.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.7.2 Measuring Instruments

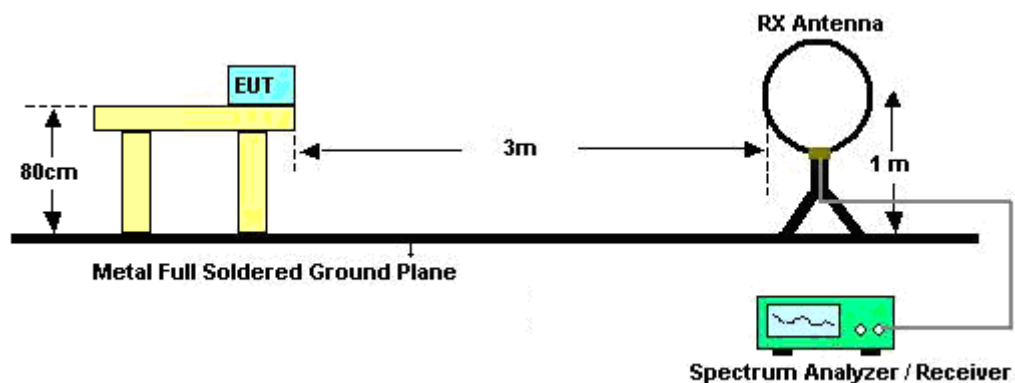
See list of measuring instruments of this test report.

3.7.3 Test Procedures

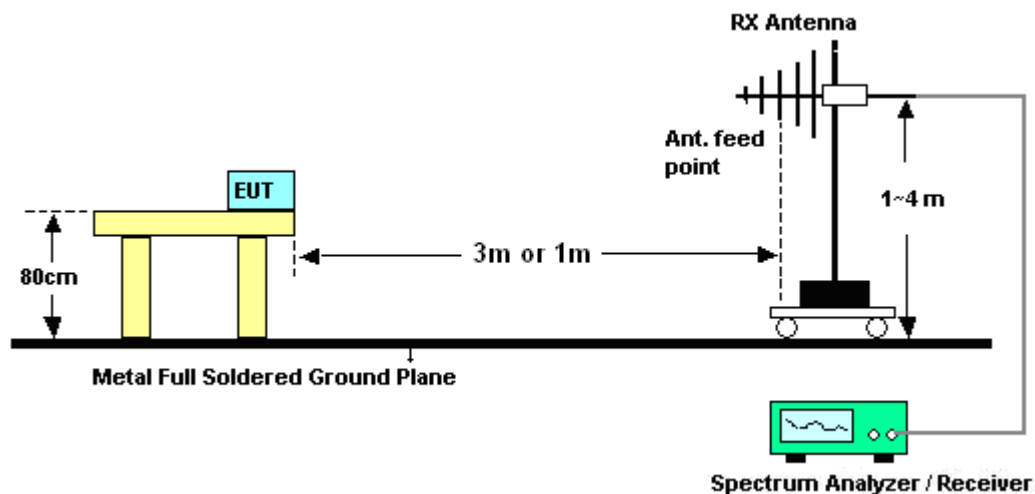
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB)
- Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

3.7.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



3.7.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

Test Engineer :	Jason Wang	Temperature :	22~24℃	
		Relative Humidity :	48~52%	

Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

3.7.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
42.69	24.43	-15.57	40	43.7	11.59	0.64	31.5	138	279	Peak
183.9	23.1	-20.4	43.5	44.31	9.05	1.26	31.52	-	-	Peak
261.93	21.72	-24.28	46	38.67	12.86	1.6	31.41	-	-	Peak
752.9	22.76	-23.24	46	28.68	21.72	3.06	30.7	-	-	Peak
889.4	25.56	-20.44	46	29.43	23.51	3.33	30.71	-	-	Peak
995.8	26.16	-27.84	54	28.39	24.84	3.51	30.58	-	-	Peak
2389.99	37.42	-16.58	54	33.06	32.18	6.03	33.85	102	24	Average
2389.99	49.71	-24.29	74	45.35	32.18	6.03	33.85	102	24	Peak
2412	108.43	-	-	104.03	32.2	6.07	33.87	102	24	Peak
2412	95.52	-	-	91.12	32.2	6.07	33.87	102	24	Average
2492	39.96	-14.04	54	35.38	32.3	6.18	33.9	102	24	Average
2492	52.1	-21.9	74	47.52	32.3	6.18	33.9	102	24	Peak



Test Mode :	Mode 1	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	26.21	-13.79	40	40.63	16.51	0.53	31.46	131	222	Peak
95.61	23.64	-19.86	43.5	44.84	9.35	0.98	31.53	-	-	Peak
178.5	26.92	-16.58	43.5	48.02	9.18	1.25	31.53	-	-	Peak
654.9	22	-24	46	29.64	20.38	2.85	30.87	-	-	Peak
825.7	24.73	-21.27	46	29.47	22.76	3.21	30.71	-	-	Peak
993.7	27.17	-26.83	54	29.43	24.82	3.5	30.58	-	-	Peak
2356.74	46.33	-27.67	74	42.05	32.13	5.99	33.84	139	322	Peak
2356.74	33.67	-20.33	54	29.39	32.13	5.99	33.84	139	322	Average
2412	101.39	-	-	96.99	32.2	6.07	33.87	139	322	Peak
2412	88.82	-	-	84.42	32.2	6.07	33.87	139	322	Average
2494	35.13	-18.87	54	30.55	32.3	6.18	33.9	139	322	Average
2494	46.52	-27.48	74	41.94	32.3	6.18	33.9	139	322	Peak
4824	50.91	-23.09	74	64.17	34.07	9.12	56.45	100	0	Peak

Test Mode :	Mode 2	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
42.69	23.8	-16.2	40	43.07	11.59	0.64	31.5	158	26	Peak
185.25	23.04	-20.46	43.5	44.24	9.06	1.26	31.52	-	-	Peak
261.93	22.7	-23.3	46	39.65	12.86	1.6	31.41	-	-	Peak
732.6	22.24	-23.76	46	28.56	21.4	3.02	30.74	-	-	Peak
856.5	25.53	-20.47	46	29.86	23.12	3.28	30.73	-	-	Peak
985.3	26.57	-27.43	54	28.94	24.71	3.5	30.58	-	-	Peak
2358	46.47	-27.53	74	42.19	32.13	5.99	33.84	133	33	Peak
2358	35.39	-18.61	54	31.11	32.13	5.99	33.84	133	33	Average
2437	108.1	-	-	103.63	32.24	6.11	33.88	133	33	Peak
2437	95.48	-	-	91.01	32.24	6.11	33.88	133	33	Average
2484	47.22	-26.78	74	42.66	32.28	6.18	33.9	133	33	Peak
2484	34.61	-19.39	54	30.05	32.28	6.18	33.9	133	33	Average



Test Mode :	Mode 2	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	26.09	-13.91	40	40.51	16.51	0.53	31.46	161	122	Peak
94.53	24.45	-19.05	43.5	45.76	9.24	0.98	31.53	-	-	Peak
182.82	26.56	-16.94	43.5	47.77	9.05	1.26	31.52	-	-	Peak
708.1	23.29	-22.71	46	30.12	21.01	2.96	30.8	-	-	Peak
858.6	25.33	-20.67	46	29.62	23.15	3.28	30.72	-	-	Peak
974.1	26.27	-27.73	54	28.8	24.56	3.48	30.57	-	-	Peak
2350	44.98	-29.02	74	40.75	32.11	5.95	33.83	132	344	Peak
2350	33.64	-20.36	54	29.41	32.11	5.95	33.83	132	344	Average
2437	89.42	-	-	84.95	32.24	6.11	33.88	132	344	Average
2437	101.99	-	-	97.52	32.24	6.11	33.88	132	344	Peak
2500	45.53	-28.47	74	40.95	32.3	6.18	33.9	132	344	Peak
2500	33.12	-20.88	54	28.54	32.3	6.18	33.9	132	344	Average

Test Mode :	Mode 3	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	24.59	-15.41	40	39.01	16.51	0.53	31.46	113	189	Peak
184.17	22.79	-20.71	43.5	44	9.05	1.26	31.52	-	-	Peak
258.42	22.51	-23.49	46	39.56	12.79	1.58	31.42	-	-	Peak
814.5	24.36	-21.64	46	29.23	22.64	3.18	30.69	-	-	Peak
914.6	24.85	-21.15	46	28.32	23.81	3.38	30.66	-	-	Peak
990.2	26.65	-27.35	54	28.96	24.77	3.5	30.58	-	-	Peak
2382	47.99	-26.01	74	43.65	32.16	6.03	33.85	102	19	Peak
2382	36.85	-17.15	54	32.51	32.16	6.03	33.85	102	19	Average
2462	96.74	-	-	92.23	32.26	6.14	33.89	102	19	Average
2462	109.45	-	-	104.94	32.26	6.14	33.89	102	19	Peak
2483.66	53.26	-20.74	74	48.7	32.28	6.18	33.9	102	19	Peak
2483.66	40.1	-13.9	54	35.54	32.28	6.18	33.9	102	19	Average

Test Mode :	Mode 3	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	26.12	-13.88	40	40.54	16.51	0.53	31.46	160	239	Peak
96.42	23.3	-20.2	43.5	44.5	9.35	0.98	31.53	-	-	Peak
181.74	26.72	-16.78	43.5	47.96	9.04	1.25	31.53	-	-	Peak
654.9	22.3	-23.7	46	29.94	20.38	2.85	30.87	-	-	Peak
839.7	25.24	-20.76	46	29.79	22.93	3.24	30.72	-	-	Peak
984.6	26.35	-27.65	54	28.75	24.69	3.49	30.58	-	-	Peak
2382	45.77	-28.23	74	41.43	32.16	6.03	33.85	100	309	Peak
2382	34.59	-19.41	54	30.25	32.16	6.03	33.85	100	309	Average
2462	90.02	-	-	85.51	32.26	6.14	33.89	100	309	Average
2462	102.05	-	-	97.54	32.26	6.14	33.89	100	309	Peak
2483.85	48.53	-25.47	74	43.97	32.28	6.18	33.9	100	309	Peak
2483.85	36.08	-17.92	54	31.52	32.28	6.18	33.9	100	309	Average



Test Mode :	Mode 4	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
42.69	24.5	-15.5	40	43.77	11.59	0.64	31.5	179	141	Peak
96.42	21.97	-21.53	43.5	43.17	9.35	0.98	31.53	-	-	Peak
186.06	22.83	-20.67	43.5	44.02	9.06	1.27	31.52	-	-	Peak
780.9	23.5	-22.5	46	28.92	22.16	3.11	30.69	-	-	Peak
906.2	25.06	-20.94	46	28.69	23.7	3.35	30.68	-	-	Peak
998.6	26.89	-27.11	54	29.08	24.88	3.51	30.58	-	-	Peak
2389.99	58.97	-15.03	74	54.61	32.18	6.03	33.85	103	15	Peak
2389.99	41.43	-12.57	54	37.07	32.18	6.03	33.85	103	15	Average
2412	107.73	-	-	103.33	32.2	6.07	33.87	103	15	Peak
2412	94.14	-	-	89.74	32.2	6.07	33.87	103	15	Average
2492	42.18	-11.82	54	37.6	32.3	6.18	33.9	103	15	Average
2492	53.99	-20.01	74	49.41	32.3	6.18	33.9	103	15	Peak

Test Mode :	Mode 4	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	25.47	-14.53	40	25.47	0	-500	-500	156	218	Peak
113.97	24.25	-19.25	43.5	43.7	11.03	1.07	31.55	-	-	Peak
183.9	26.75	-16.75	43.5	47.96	9.05	1.26	31.52	-	-	Peak
749.4	22.86	-23.14	46	28.83	21.67	3.06	30.7	-	-	Peak
864.9	25.12	-20.88	46	29.33	23.22	3.29	30.72	-	-	Peak
984.6	26.82	-27.18	54	29.22	24.69	3.49	30.58	-	-	Peak
2389.99	52.88	-21.12	74	48.52	32.18	6.03	33.85	100	263	Peak
2389.99	36.01	-17.99	54	31.65	32.18	6.03	33.85	100	263	Average
2412	101.63	-	-	97.23	32.2	6.07	33.87	100	263	Peak
2412	89.14	-	-	84.74	32.2	6.07	33.87	100	263	Average
2486	35.48	-18.52	54	30.92	32.28	6.18	33.9	100	263	Average
2486	47.72	-26.28	74	43.16	32.28	6.18	33.9	100	263	Peak



Test Mode :	Mode 5	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
40.26	21.74	-18.26	40	40.12	12.5	0.63	31.51	100	247	Peak
122.34	20.87	-22.63	43.5	39.78	11.54	1.11	31.56	-	-	Peak
253.29	20.79	-25.21	46	37.93	12.72	1.55	31.41	-	-	Peak
702.5	21.41	-24.59	46	28.37	20.92	2.94	30.82	-	-	Peak
844.6	23.88	-22.12	46	28.36	22.99	3.26	30.73	-	-	Peak
953.8	24.08	-21.92	46	26.89	24.3	3.46	30.57	-	-	Peak
2358	47.18	-26.82	74	42.9	32.13	5.99	33.84	105	35	Peak
2358	35.95	-18.05	54	31.67	32.13	5.99	33.84	105	35	Average
2437	108.3	-	-	103.83	32.24	6.11	33.88	105	35	Peak
2437	95.44	-	-	90.97	32.24	6.11	33.88	105	35	Peak
2484	51.94	-22.06	74	47.38	32.28	6.18	33.9	105	35	Peak
2484	38.76	-15.24	54	34.2	32.28	6.18	33.9	105	35	Average



Test Mode :	Mode 5	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
35.94	25.13	-14.87	40	41.16	14.86	0.59	31.48	110	106	Peak
95.34	23.05	-20.45	43.5	44.36	9.24	0.98	31.53	-	-	Peak
176.34	24.98	-18.52	43.5	45.94	9.33	1.24	31.53	-	-	Peak
691.3	21.24	-24.76	46	28.36	20.79	2.92	30.83	-	-	Peak
845.3	24.14	-21.86	46	28.61	23	3.26	30.73	-	-	Peak
955.2	24.67	-21.33	46	27.44	24.33	3.47	30.57	-	-	Peak
2318	45.23	-28.77	74	41.04	32.09	5.92	33.82	165	317	Peak
2318	33.39	-20.61	54	29.2	32.09	5.92	33.82	165	317	Average
2437	102.52	-	-	98.05	32.24	6.11	33.88	165	317	Peak
2437	89.18	-	-	84.71	32.24	6.11	33.88	165	317	Average
2492	46.6	-27.4	74	42.02	32.3	6.18	33.9	165	317	Peak
2492	34.31	-19.69	54	29.73	32.3	6.18	33.9	165	317	Average



Test Mode :	Mode 6	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
40.26	22.13	-17.87	40	40.51	12.5	0.63	31.51	116	231	Peak
126.66	20.84	-22.66	43.5	39.71	11.57	1.13	31.57	-	-	Peak
192.54	21.22	-22.28	43.5	42.35	9.08	1.29	31.5	-	-	Peak
746.6	22.04	-23.96	46	28.07	21.63	3.05	30.71	-	-	Peak
863.5	24.36	-21.64	46	28.59	23.2	3.29	30.72	-	-	Peak
949.6	24.24	-21.76	46	27.1	24.25	3.46	30.57	-	-	Peak
2382	49.17	-24.83	74	44.83	32.16	6.03	33.85	102	17	Peak
2382	37.95	-16.05	54	33.61	32.16	6.03	33.85	102	17	Average
2462	96.18	-	-	91.67	32.26	6.14	33.89	102	17	Average
2462	108.58	-	-	104.07	32.26	6.14	33.89	102	17	Peak
2483.5	69.16	-4.84	74	64.6	32.28	6.18	33.9	102	17	Peak
2483.5	49.31	-4.69	54	44.75	32.28	6.18	33.9	102	17	Average

Test Mode :	Mode 6	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	48~52%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
37.29	23.43	-16.57	40	40.41	13.91	0.6	31.49	182	331	Peak
92.37	22.76	-20.74	43.5	44.42	8.9	0.96	31.52	-	-	Peak
183.9	26.57	-16.93	43.5	47.78	9.05	1.26	31.52	-	-	Peak
754.3	22.23	-23.77	46	28.11	21.75	3.07	30.7	-	-	Peak
867.7	24.07	-21.93	46	28.23	23.26	3.3	30.72	-	-	Peak
974.1	25.76	-28.24	54	28.29	24.56	3.48	30.57	-	-	Peak
2382	46.22	-27.78	74	41.88	32.16	6.03	33.85	100	293	Peak
2382	34.54	-19.46	54	30.2	32.16	6.03	33.85	100	293	Average
2462	89.91	-	-	85.4	32.26	6.14	33.89	100	293	Average
2462	102.73	-	-	98.22	32.26	6.14	33.89	100	293	Peak
2483.85	61.98	-12.02	74	57.42	32.28	6.18	33.9	100	293	Peak
2483.85	41.82	-12.18	54	37.26	32.28	6.18	33.9	100	293	Average

3.8 Antenna Requirements

3.8.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.8.2 Antenna Connected Construction

The antennas type used in this product is PIFA Antenna without connector and it is considered to meet antenna requirement.

3.8.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101329	9kHz~30GHz	Apr. 26, 2010	Apr. 25, 2011	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	117995	N/A	Mar. 19, 2009	Mar. 18, 2011	Conduction (CO05-HY)
GPS Station	T&E	GS-50	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2010	Oct. 30, 2011	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 03, 2010	Dec. 02, 2011	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2010	Aug. 18, 2011	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A023 62	1GHz~ 26.5GHz	Dec. 06, 2010	Dec. 05, 2011	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 27, 2010	Mar. 26, 2011	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/00 1	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
Combined Standard Uncertainty $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26		

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	± 0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	± 1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	± 0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site Imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP0D2335 as below.